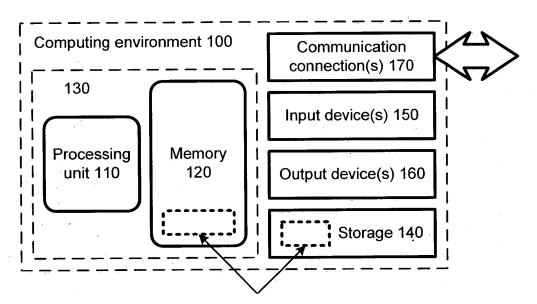
Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003

Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 1 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391

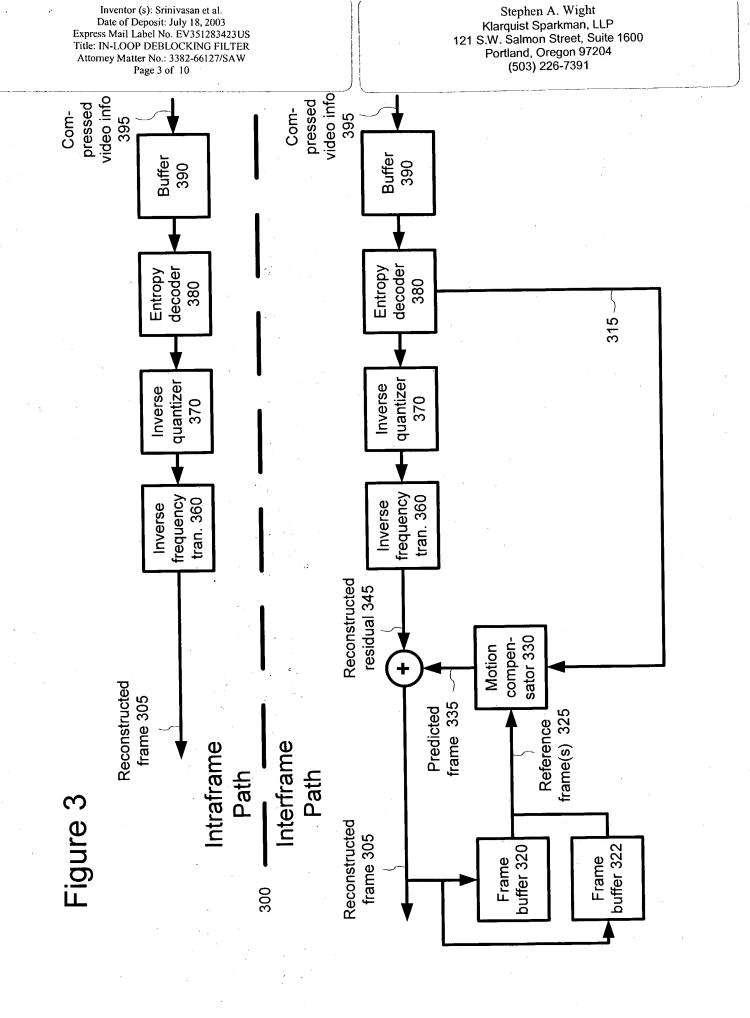
Figure 1



Software 180 implementing video encoder or decoder

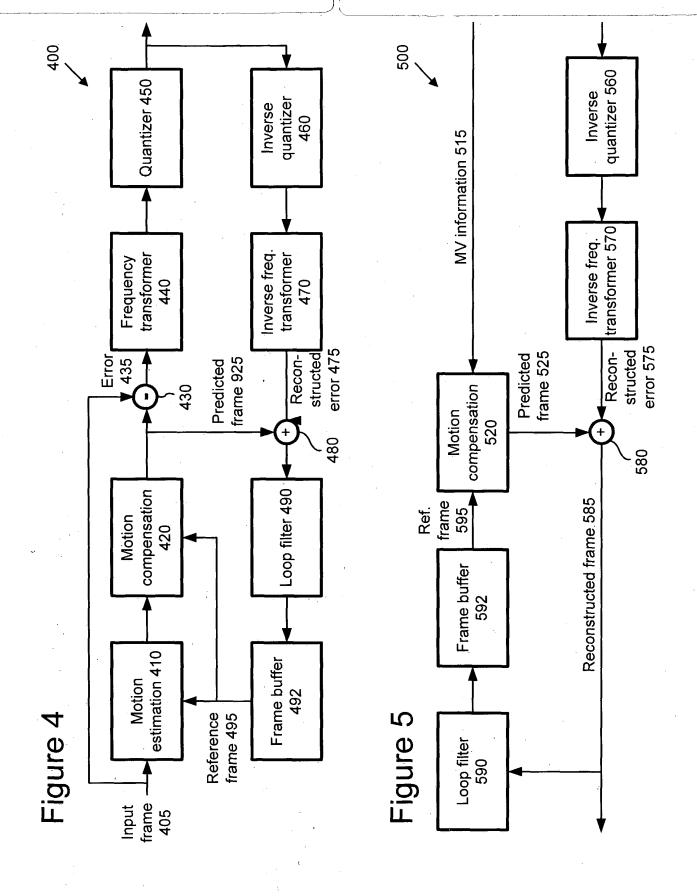
Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Express Mail Label No. EV351283423US Title: IN-LOOP DEBLOCKING FILTER Attorney Matter No.: 3382-66127/SAW Page 2 of 10 Portland, Oregon 97204 (503) 226-7391 video info video info pressed pressed Com-Com-**-**295 Buffer 290 Buffer 290 coder 280 coder 280 Entropy Entropy 215 Quantizer quantizer 276 Quantizer 270 Inverse Frequency store 222 Frequency frequency Frame transformer 260 tran. 266 transfor-Inverse mer 260 store 220 Frame Residual 245 Current frame 205 sator 230 compen-Motion Intraframe Interframe 235 ~ Path Path Figure 2 frame(s) 225 Reference_ estimator Motion 210 frame 205 Current 200

Inventor (s): Srinivasan et al. Date of Deposit: July 18, 2003



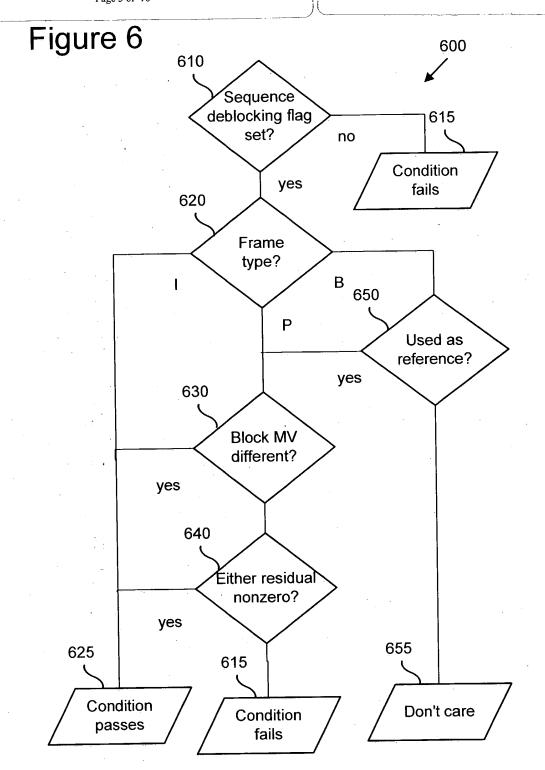
Inventor (s): Srinivasan et al. Date of Deposit: July 18, 2003 Express Mail Label No. EV351283423US Title: IN-LOOP DEBLOCKING FILTER Attorney Matter No.: 3382-66127/SAW Page 4 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391



Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 5 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391



Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 6 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391

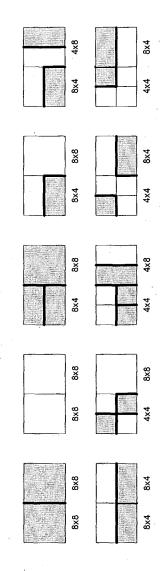


Figure 7

Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 7 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391



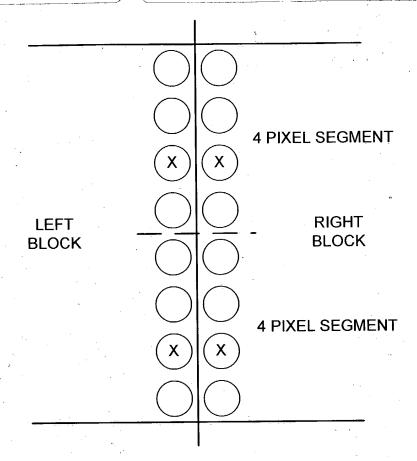
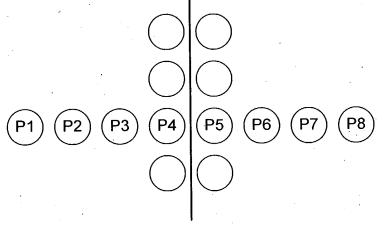


Figure 9



PIXELS IN EDGE STRENGTH DETERMINATION

Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 8 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391

Figure 10

```
function edge_strength (P1...P8)

a0 = (2*(P3 - P6) - 5*(P4 - P5) + 4) >> 3

if (|a0| < QP) {

a1 = (2*(P1 - P4) - 5*(P2 - P3) + 4) >> 3

a2 = (2*(P5 - P8) - 5*(P6 - P7) + 4) >> 3

a3 = min(|a1|, |a2|)

if (a3 < |a0|)

return true

else

return false
}
else

return false
```

1000

Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 9 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391

Figure 11

```
function filter_edge (P1...P8)
a0 = (2*(P3 - P6) - 5*(P4 - P5) + 4) >> 3
if (|a0| < QP) {
    a1 = (2*(P1 - P4) - 5*(P2 - P3) + 4) >> 3
    a2 = (2*(P5 - P8) - 5*(P6 - P7) + 4) >> 3
      a3 = min(|a1|, |a2|)
    if (a3 < |a0|) {
         d = 5*((sign(a0) * a3) - a0) / 8
         clip = (P4 - P5)/2
         if (clip > 0) {
               if (d < 0)
                      d = 0
               if (d > clip)
                      d = clip
               P4 = P4 - d
               P5 = P5 + d
         else if (clip < 0) {
               if (d > 0)
                      d = 0
               if (d < clip)
                      d = clip
               P4 = P4 - d
               P5 = P5 + d
```

1100 / Inventor (s): Srinivasan et al.
Date of Deposit: July 18, 2003
Express Mail Label No. EV351283423US
Title: IN-LOOP DEBLOCKING FILTER
Attorney Matter No.: 3382-66127/SAW
Page 10 of 10

Stephen A. Wight Klarquist Sparkman, LLP 121 S.W. Salmon Street, Suite 1600 Portland, Oregon 97204 (503) 226-7391

4 BY 16 CHROMINANCE BLOCK

16 BY 16 LUMINANCE BLOCK

								,							
(Ξ)	(Ξ)	(Ξ)	\bigcirc	$\overline{\mathbf{z}}$	(\mathbf{S})	(Ξ)	(Ξ)	$(\mathbf{\Sigma})$	$(\mathbf{\Sigma})$	(Ξ)	(Ξ)	(Ξ)	(Ξ)	(Ξ)	\bigcirc
(2)	(S)	(2)	(S)	(2)	(S)	(2)	(2)	(3)	(S)	(2)	(S)	(2)	(S)	(2)	(S)
	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc			\bigcirc	\bigcirc	
	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		\bigcirc	\bigcirc	\bigcirc		\bigcirc
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	Ó	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		\bigcirc	\bigcirc
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
(B)	(a)	(m)	(m)	(m)	(a)	(m)	(B)	(B)	(B)	(a)	(m)	(B)	(m)	(B)	(B)
(B)	®	(B)	(B)	(B)	(B)	(B)	(B)	(B)	(B)	®	(B)	(B)	(B)	(B)	(B)
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		\bigcirc	\bigcirc
	\bigcirc	\bigcirc	\bigcirc		\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc		\bigcirc
\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
	\bigcirc	\bigcirc	\bigcirc		\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc	\bigcirc
${\bf \Sigma}$	<u>(S)</u>	(\S	(\S	<u>(S)</u>	<u>(S)</u>	<u>(S)</u>	(\S	oximes	(Ξ)	(\S	(2)	(\S)	<u>(S)</u>	(2)	(\mathbf{Z})
(2)	(\S)	\(\S \)	(2)	2	(\S	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(S)	(2)	(S)

M - BLOCK BOUNDARY PIXELS ACROSS MACROBLOCK B - BLOCK BOUNDARY PIXELS WITHIN MACROBLOCK